

# Micro-Kernel Architecture using OSGi Framework.

Sri Lanka Institute of Information Technology

Software Architecture (2021) – SE3030.

Assignment 1.

**Group ID: - 2021S1\_REG\_WD\_18**

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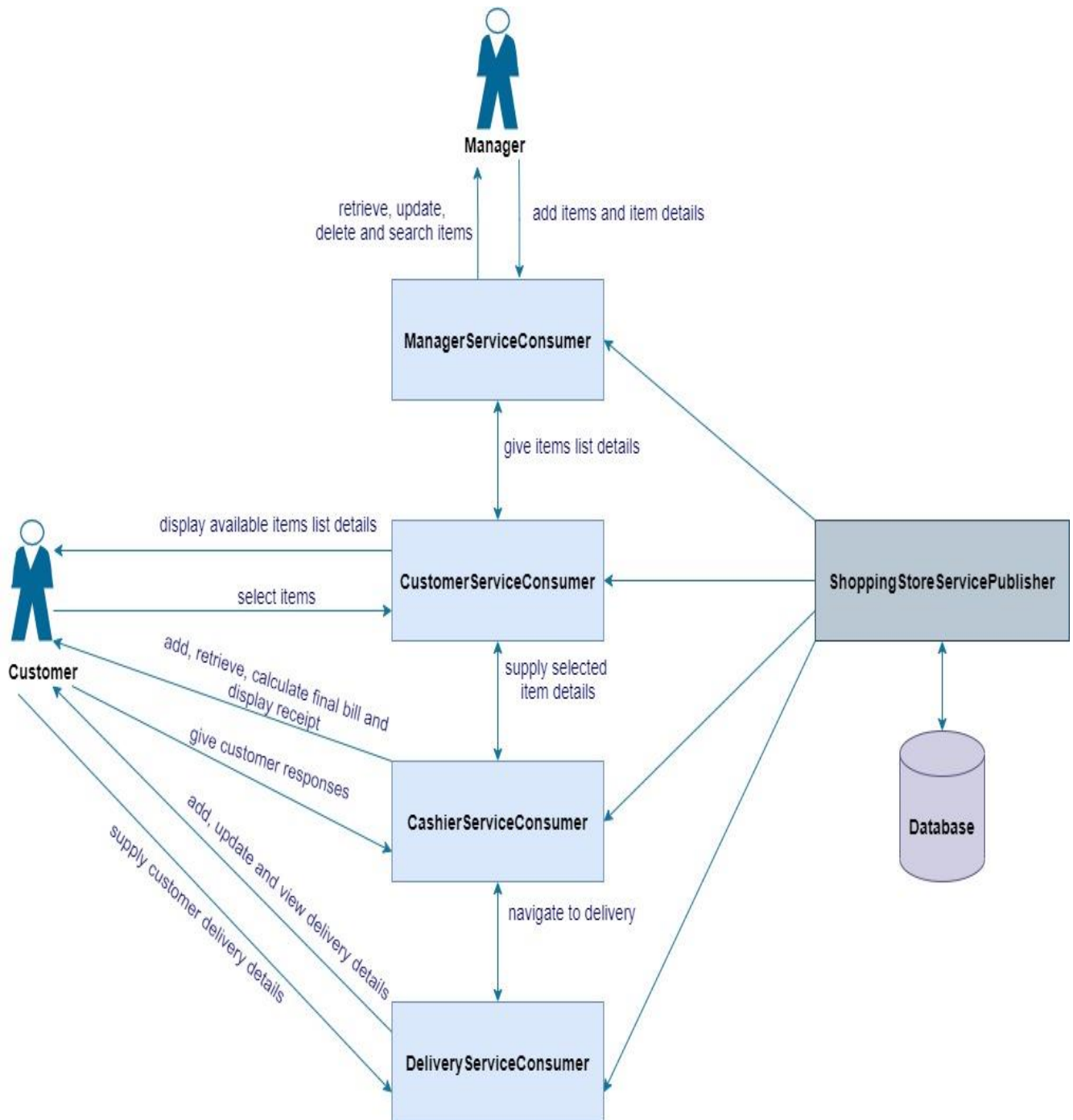
## **Introduction**

### **Shopping Store Service**

This is an OSGi system implementation of the producer (Publisher) – Consumer situation. MicroKernel Architecture was used in this program and this was deployed by Eclipse Equinox. Our Group creates this simple OSGI architecture for Shopping Store Service. MicroKernel Architecture was used to create this Shopping Store Service Which was built with Java and Apache Felix OSGI Framework. There are separate service bundles as producers(Publisher) and to consume that service as a consumer. To get best practices of the OSGi we used producer service interface only not the implementation Consumers can work through the interfaces.

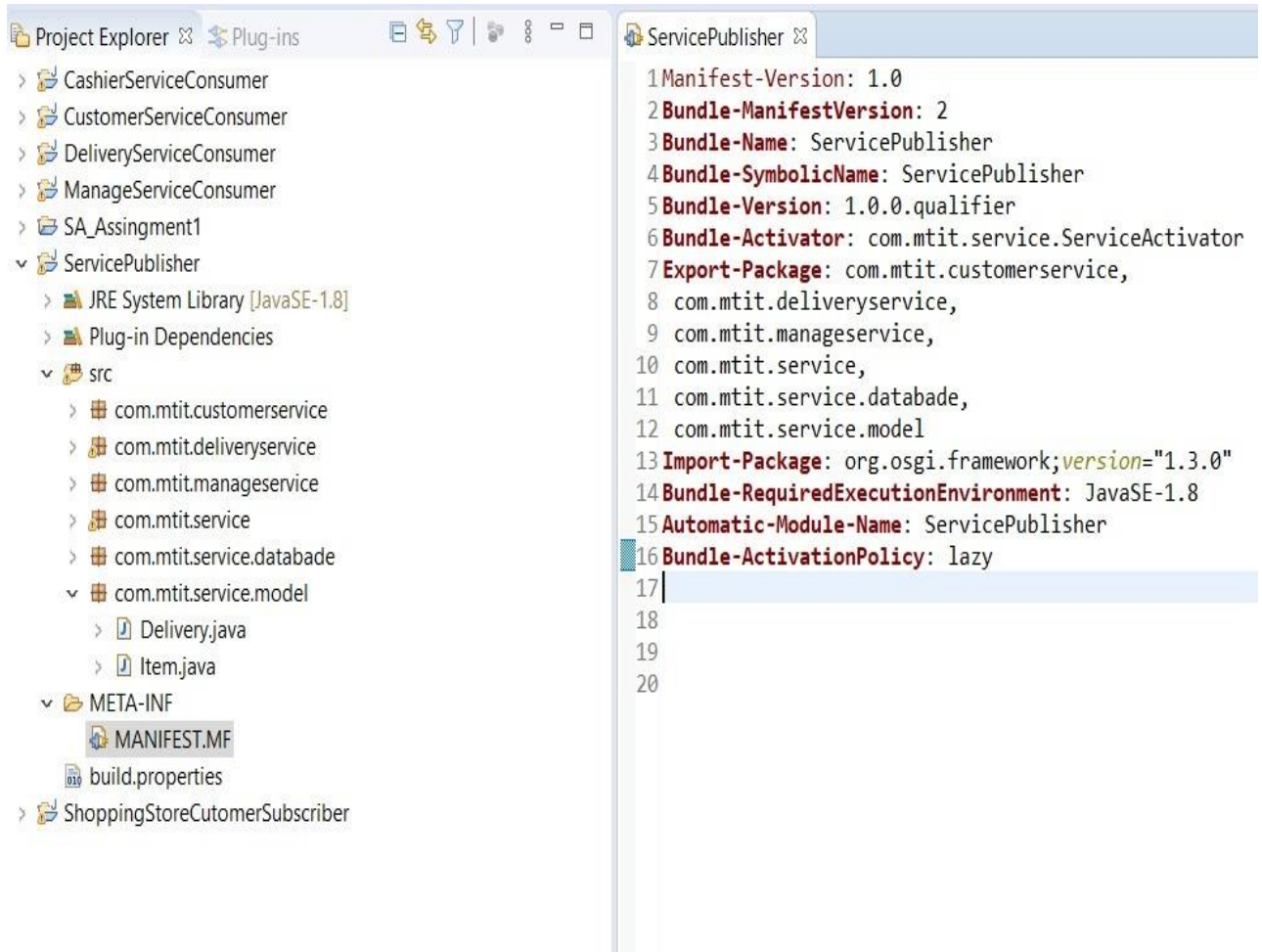
This Micro Kernal architecture is based on the Online Shopping System. In here Manager, cashiers, operate together to sell their products to Customers. There is one Producer (Publisher) with Four Consumers. Four Consumers are Manager, Cashier, Customer, and Delivery Person. Customer Can select the items that he wants to buy. Then Cashier creates the bill and adds the discount if available then Displays the bill. Manager Add the Items, Retrieve them, Update and delete them when necessary. In Delivery Option, Delivery was free throughout the Galle district and for other districts add small delivery Charges. Also Delivery Person can update delete delivery details.

## Diagrammatic Overview



## A) Manifest Implementation

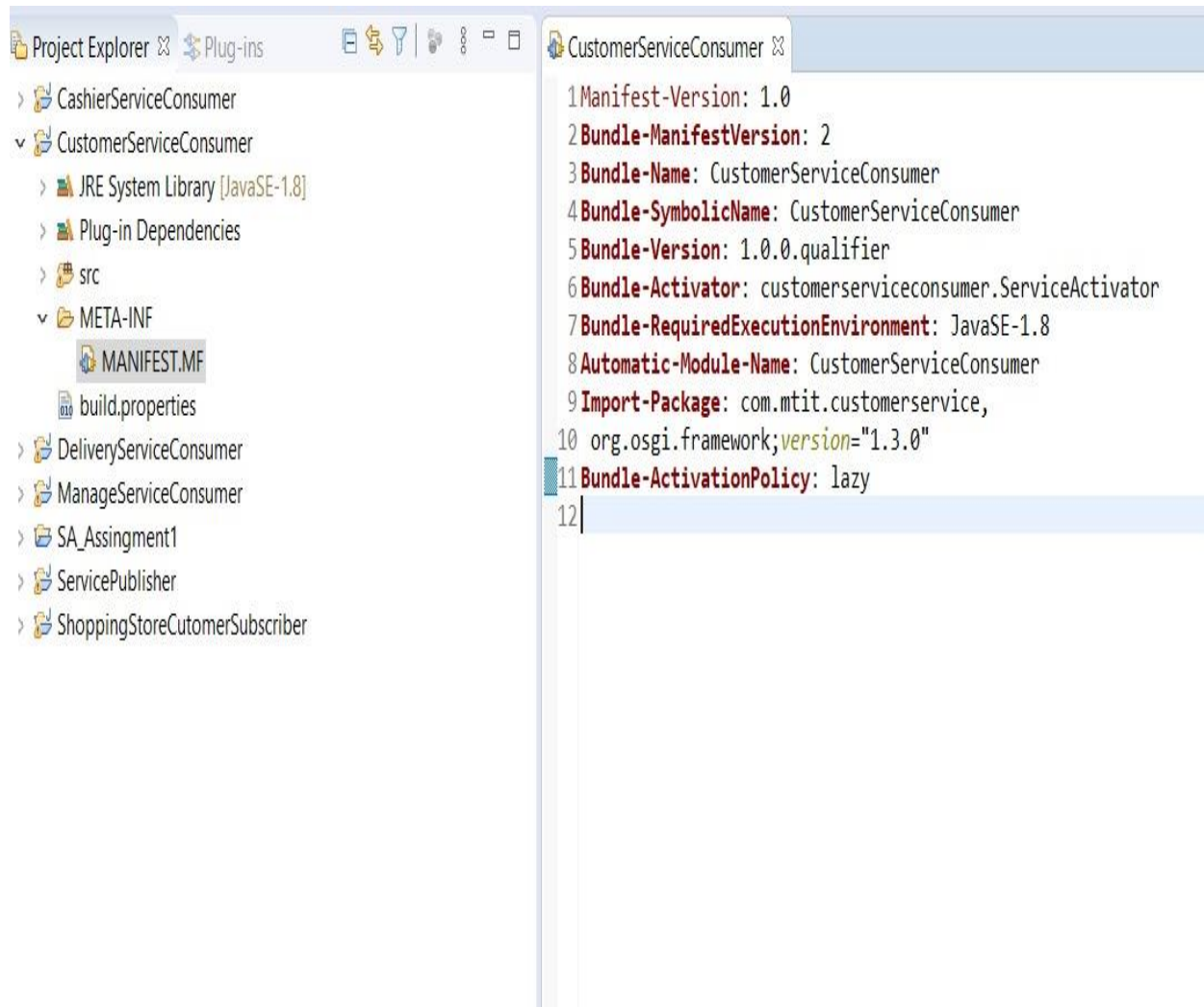
### 1. Service Publisher Manifest



The screenshot displays an IDE interface with two main panels. The left panel, titled 'Project Explorer', shows a project named 'ServicePublisher'. Under the 'src' folder, there are several package folders: 'com.mtit.customerservice', 'com.mtit.deliveryservice', 'com.mtit.manageservice', 'com.mtit.service', 'com.mtit.service.databade', and 'com.mtit.service.model'. The 'com.mtit.service.model' folder contains two files: 'Delivery.java' and 'Item.java'. Below the 'src' folder is a 'META-INF' folder containing a 'MANIFEST.MF' file. The right panel, titled 'ServicePublisher', shows the content of the 'MANIFEST.MF' file. The manifest text is as follows:

```
1 Manifest-Version: 1.0
2 Bundle-ManifestVersion: 2
3 Bundle-Name: ServicePublisher
4 Bundle-SymbolicName: ServicePublisher
5 Bundle-Version: 1.0.0.qualifier
6 Bundle-Activator: com.mtit.service.ServiceActivator
7 Export-Package: com.mtit.customerservice,
8 com.mtit.deliveryservice,
9 com.mtit.manageservice,
10 com.mtit.service,
11 com.mtit.service.databade,
12 com.mtit.service.model
13 Import-Package: org.osgi.framework;version="1.3.0"
14 Bundle-RequiredExecutionEnvironment: JavaSE-1.8
15 Automatic-Module-Name: ServicePublisher
16 Bundle-ActivationPolicy: lazy
17
18
19
20
```

## 2.Customer Service Consumer Manifest



The screenshot displays an IDE interface with two main panels. The left panel, titled 'Project Explorer', shows a project structure with several sub-projects: 'CashierServiceConsumer', 'CustomerServiceConsumer', 'DeliveryServiceConsumer', 'ManageServiceConsumer', 'SA\_Assingment1', 'ServicePublisher', and 'ShoppingStoreCuterSubscriber'. The 'CustomerServiceConsumer' project is expanded, revealing its internal structure: 'JRE System Library [JavaSE-1.8]', 'Plug-in Dependencies', 'src', 'META-INF' (containing 'MANIFEST.MF'), and 'build.properties'. The right panel, titled 'CustomerServiceConsumer', shows the content of the 'MANIFEST.MF' file. The manifest text is as follows:

```
1 Manifest-Version: 1.0
2 Bundle-ManifestVersion: 2
3 Bundle-Name: CustomerServiceConsumer
4 Bundle-SymbolicName: CustomerServiceConsumer
5 Bundle-Version: 1.0.0.qualifier
6 Bundle-Activator: customerserviceconsumer.ServiceActivator
7 Bundle-RequiredExecutionEnvironment: JavaSE-1.8
8 Automatic-Module-Name: CustomerServiceConsumer
9 Import-Package: com.mtit.customerservice,
10 org.osgi.framework;version="1.3.0"
11 Bundle-ActivationPolicy: lazy
12
```

### 3. Cashier Service Consumer Manifest

The screenshot displays an IDE interface with two main panels. The left panel, titled 'Project Explorer', shows a project structure with a folder named 'CashierServiceConsumer'. Under this folder, there is a 'META-INF' directory containing a 'MANIFEST.MF' file, which is currently selected. Other files in the project include 'JRE System Library [JavaSE-1.8]', 'Plug-in Dependencies', 'src', 'build.properties', and several other bundles like 'CustomerServiceConsumer', 'DeliveryServiceConsumer', 'ManageServiceConsumer', 'SA\_Assingment1', 'ServicePublisher', and 'ShoppingStoreCutomerSubscriber'. The right panel shows the content of the selected 'MANIFEST.MF' file. It contains a list of OSGi bundle metadata properties, each preceded by a line number from 1 to 14. The properties include the manifest version, bundle name, symbolic name, activator class, bundle version, required execution environment, imported packages, automatic module name, and activation policy.

```
1 Manifest-Version: 1.0
2 Bundle-ManifestVersion: 2
3 Bundle-Name: CashierServiceConsumer
4 Bundle-SymbolicName: CashierServiceConsumer
5 Bundle-Activator: cashierserviceconsumer.ServiceActivator
6 Bundle-Version: 1.0.0.qualifier
7 Bundle-RequiredExecutionEnvironment: JavaSE-1.8
8 Import-Package: com.mtit.service,
9 com.mtit.service.databade,
10 com.mtit.service.model,
11 org.osgi.framework;version="1.3.0"
12 Automatic-Module-Name: CashierServiceConsumer
13 Bundle-ActivationPolicy: lazy
14
```

## 4. Manager Service Consumer Manifest

The screenshot displays an IDE interface with two main panels. The left panel, titled 'Project Explorer', shows a project structure with several bundles: CashierServiceConsumer, CustomerServiceConsumer, DeliveryServiceConsumer, ManageServiceConsumer (expanded), SA\_Assingment1, ServicePublisher, and ShoppingStoreCutomerSubscriber. Under 'ManageServiceConsumer', the 'META-INF' folder is expanded, showing 'MANIFEST.MF' and 'build.properties'. The right panel shows the content of 'MANIFEST.MF' for the 'ManageServiceConsumer' bundle. The manifest file contains the following properties:

```
1 Manifest-Version: 1.0
2 Bundle-ManifestVersion: 2
3 Bundle-Name: ManageServiceConsumer
4 Bundle-SymbolicName: ManageServiceConsumer
5 Bundle-Version: 1.0.0.qualifier
6 Bundle-Activator: manageserviceconsumer.Activator
7 Bundle-RequiredExecutionEnvironment: JavaSE-1.8
8 Automatic-Module-Name: ManageServiceConsumer
9 Import-Package: com.mtit.manageservice,
10 com.mtit.service.model,
11 org.osgi.framework;version="1.3.0"
12 Bundle-ActivationPolicy: lazy
13
```



## 5.Delivery Service Consumer Manifest

The screenshot displays an IDE interface with two main panels. The left panel, titled 'Project Explorer', shows a project structure with several bundles: CashierServiceConsumer, CustomerServiceConsumer, DeliveryServiceConsumer (expanded), ManageServiceConsumer, SA\_Assingment1, ServicePublisher, and ShoppingStoreCutomerSubscriber. Under DeliveryServiceConsumer, the 'META-INF' folder is expanded, showing 'MANIFEST.MF' (selected) and 'build.properties'. The right panel shows the content of 'MANIFEST.MF' with the following text:

```
1 Manifest-Version: 1.0
2 Bundle-ManifestVersion: 2
3 Bundle-Name: DeliveryServiceConsumer
4 Bundle-SymbolicName: DeliveryServiceConsumer
5 Bundle-Version: 1.0.0.qualifier
6 Bundle-Activator: deliveryserviceconsumer.ServiceActivator
7 Bundle-RequiredExecutionEnvironment: JavaSE-1.8
8 Automatic-Module-Name: DeliveryServiceConsumer
9 Import-Package: com.mtit.deliveryservice,
10 com.mtit.service.model,
11 org.osgi.framework;version="1.3.0"
12 Bundle-ActivationPolicy: lazy
13
```



## C) All commands of Bundle install and run in OSGi Framework.

### 1.Manager Consumer Stop

```
684    ACTIVE    org.opentest4j_1.2.0.v20190826-0900
685    ACTIVE    org.sat4j.core_2.3.5.v201308161310
686    ACTIVE    org.sat4j.pb_2.3.5.v201404071733
687    ACTIVE    org.slf4j.api_1.7.30.v20200204-2150
        Fragments=6
688    ACTIVE    org.slf4j.api_1.7.2.v20121108-1250
        Fragments=689
689    RESOLVED   org.slf4j.impl.log4j12_1.7.2.v20131105-2200
        Master=688
690    ACTIVE    org.tukaani.xz_1.8.0.v20180207-1613
691    ACTIVE    org.uddi4j_2.0.5.v200805270300
692    ACTIVE    org.w3c.css.sac_1.3.1.v200903091627
693    ACTIVE    org.w3c.dom.events_3.0.0.draft20060413_v201105210656
694    ACTIVE    org.w3c.dom.smil_1.0.1.v200903091627
695    ACTIVE    org.w3c.dom.svg_1.1.0.v201011041433
osgi> stop 2
=====ShoppingStore manager consumer stopped.=====
```

### 2.Manager Consumer Start

```
688    ACTIVE    org.slf4j.api_1.7.2.v20121108-1250
        Fragments=689
689    RESOLVED   org.slf4j.impl.log4j12_1.7.2.v20131105-2200
        Master=688
690    ACTIVE    org.tukaani.xz_1.8.0.v20180207-1613
691    ACTIVE    org.uddi4j_2.0.5.v200805270300
692    ACTIVE    org.w3c.css.sac_1.3.1.v200903091627
693    ACTIVE    org.w3c.dom.events_3.0.0.draft20060413_v201105210656
694    ACTIVE    org.w3c.dom.smil_1.0.1.v200903091627
695    ACTIVE    org.w3c.dom.svg_1.1.0.v201011041433
osgi> stop 2
=====ShoppingStore manager consumer stopped.=====
osgi> start 2
=====ShoppingStore manager consumer started.=====
-----Welcome to Items Management-----
Please Select an option to continue.....
Options
1.Add a new item  to the store
2.Update an item in the store
3.Delete an item from the store
4.List All Items
5.Search Item by Name
6.Exit
Enter your option...
```

### 3.Delivery Consumer Stop

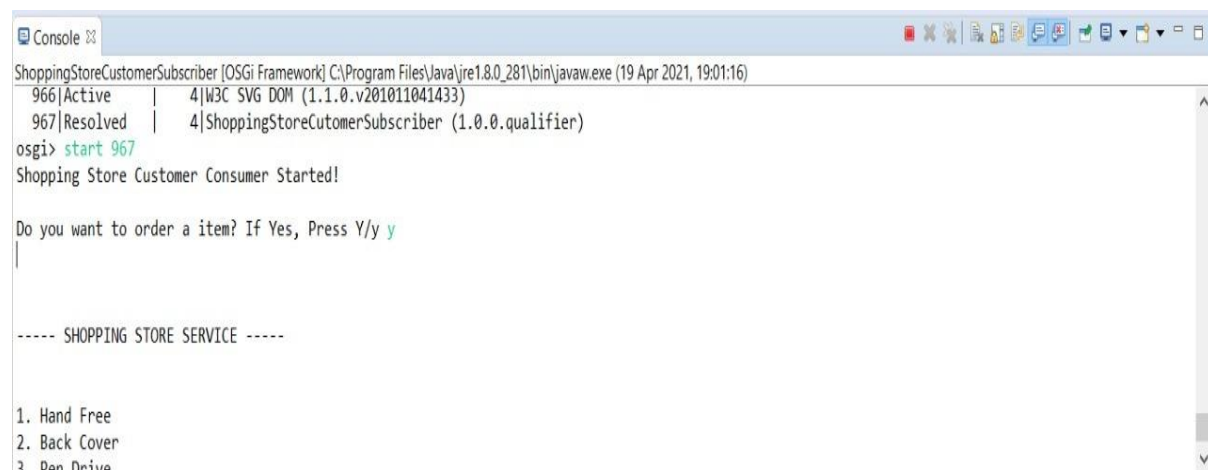
```
685    ACTIVE    org.sat4j.core_2.3.5.v201308161310
686    ACTIVE    org.sat4j.pb_2.3.5.v201404071733
687    ACTIVE    org.slf4j.api_1.7.30.v20200204-2150
        Fragments=6
688    ACTIVE    org.slf4j.api_1.7.2.v20121108-1250
        Fragments=689
689    RESOLVED   org.slf4j.impl.log4j12_1.7.2.v20131105-2200
        Master=688
690    ACTIVE    org.tukaani.xz_1.8.0.v20180207-1613
691    ACTIVE    org.uddi4j_2.0.5.v200805270300
692    ACTIVE    org.w3c.css.sac_1.3.1.v200903091627
693    ACTIVE    org.w3c.dom.events_3.0.0.draft20060413_v201105210656
694    ACTIVE    org.w3c.dom.smil_1.0.1.v200903091627
695    ACTIVE    org.w3c.dom.svg_1.1.0.v201011041433
osgi> stop 2
=====Delivery Service Consumer Stopped=====
osgi>
```

### 4.Delivery Consumer Start

```
689    RESOLVED   org.slf4j.impl.log4j12_1.7.2.v20131105-2200
        Master=688
690    ACTIVE    org.tukaani.xz_1.8.0.v20180207-1613
691    ACTIVE    org.uddi4j_2.0.5.v200805270300
692    ACTIVE    org.w3c.css.sac_1.3.1.v200903091627
693    ACTIVE    org.w3c.dom.events_3.0.0.draft20060413_v201105210656
694    ACTIVE    org.w3c.dom.smil_1.0.1.v200903091627
695    ACTIVE    org.w3c.dom.svg_1.1.0.v201011041433
osgi> stop 2
=====Delivery Service Consumer Stopped=====
osgi> start 2
=====Shopping Store Deliver Consumer Started!=====
```

Do you want to deliver the purchased item? If Yes, Press Y/y

### 5.Customer Consumer Start



```
Console
ShoppingStoreCustomerSubscriber [OSGi Framework] C:\Program Files\Java\jre1.8.0_281\bin\javaw.exe (19 Apr 2021, 19:01:16)
966|Active    | 4|W3C SVG DOM (1.1.0.v201011041433)
967|Resolved   | 4|ShoppingStoreCustomerSubscriber (1.0.0.qualifier)
osgi> start 967
Shopping Store Customer Consumer Started!

Do you want to order a item? If Yes, Press Y/y y

----- SHOPPING STORE SERVICE -----

1. Hand Free
2. Back Cover
3. Don Order
```

## 6. Customer Consumer Stop

```
ShoppingStoreCustomerSubscriber [OSGi Framework] C:\Program Files\Java\jre1.8.0_281\bin\javaw.exe (19 Apr 2021, 19:18:03)
963|Active      | 4|W3C CSS SAC (1.3.1.v200903091627)
964|Active      | 4|W3C DOM Level 3 Events (3.0.0.draft20060413_v201105210656)
965|Active      | 4|W3C SMIL DOM (1.0.1.v200903091627)
966|Active      | 4|W3C SVG DOM (1.1.0.v201011041433)
971|Active      | 4|ShoppingStoreCustomerProducer (1.0.0.qualifier)
972|Active      | 4|ShoppingStoreCustomerSubscriber (1.0.0.qualifier)
osgi> stop 971
Shopping Store Customer Producer Stopped!
osgi> stop 972
Good Bye!!!
osgi> start 971
Shopping Store Customer Producer Started!
osgi>
```

## 7. Customer Consumer Uninstall

```
Overview | Dependencies | Runtime | Build | MANIFEST.MF | build.properties
ShoppingStoreCustomerSubscriber [OSGi Framework] C:\Program Files\Java\jre1.8.0_281\bin\javaw.exe (19 Apr 2021, 19:10:59)
953|Active      | 4|Mozilla Rhino (1.7.5.v201504281450)
954|Active      | 4|ASM (5.0.1.v201404251740)
955|Active      | 4|ASM Tree class visitor (5.0.1.v201404251740)
956|Active      | 4|SAT4J Core (2.3.5.v201308161310)
957|Active      | 4|SAT4J Pseudo (2.3.5.v201404071733)
958|Active      | 4|SLF4J API (1.7.2.v20121108-1250)
959|Resolved    | 1|SLF4J LOG4J-12 Binding (1.7.2.v20131105-2200)
960|Active      | 4|m2e connector for the mavenarchiver and pom properties (0.17.2.201606141937-signed-20160830073346)
961|Active      | 4|XZ data compression (1.3.0.v201308270617)
962|Active      | 4|UDDI4J (2.0.5.v200805270300)
963|Active      | 4|W3C CSS SAC (1.3.1.v200903091627)
964|Active      | 4|W3C DOM Level 3 Events (3.0.0.draft20060413_v201105210656)
965|Active      | 4|W3C SMIL DOM (1.0.1.v200903091627)
966|Active      | 4|W3C SVG DOM (1.1.0.v201011041433)
970|Active      | 4|ShoppingStoreCustomerSubscriber (1.0.0.qualifier)
osgi> uninstall 970
Good Bye!!!
osgi>
```

## 8. Delivery Consumer Uninstall

```
685    ACTIVE      org.objectweb.asm.tree_7.2.0.v20191010-1910
686    ACTIVE      org.objectweb.asm.tree_7.0.0.v20181030-2244
687    ACTIVE      org.opentest4j_1.2.0.v20190826-0900
688    ACTIVE      org.sat4j.core_2.3.5.v201308161310
689    ACTIVE      org.sat4j.pb_2.3.5.v201404071733
690    ACTIVE      org.slf4j.api_1.7.30.v20200204-2150
        Fragments=9
691    ACTIVE      org.slf4j.api_1.7.2.v20121108-1250
        Fragments=692
692    RESOLVED    org.slf4j.impl.log4j12_1.7.2.v20131105-2200
        Master=691
693    ACTIVE      org.tukaani.xz_1.8.0.v20180207-1613
694    ACTIVE      org.uddi4j_2.0.5.v200805270300
695    ACTIVE      org.w3c.css.sac_1.3.1.v200903091627
696    ACTIVE      org.w3c.dom.events_3.0.0.draft20060413_v201105210656
697    ACTIVE      org.w3c.dom.smil_1.0.1.v200903091627
698    ACTIVE      org.w3c.dom.svg_1.1.0.v201011041433
osgi> uninstall 4
=====Delivery Service Consumer Stopped=====
osgi>
```



## 9.Manager Consumer Uninstall

```
689      ACTIVE      org.sat4j.pb_2.3.5.v201404071733
690      ACTIVE      org.slf4j.api_1.7.30.v20200204-2150
                        Fragments=9
691      ACTIVE      org.slf4j.api_1.7.2.v20121108-1250
                        Fragments=692
692      RESOLVED    org.slf4j.impl.log4j12_1.7.2.v20131105-2200
                        Master=691
693      ACTIVE      org.tukaani.xz_1.8.0.v20180207-1613
694      ACTIVE      org.uddi4j_2.0.5.v200805270300
695      ACTIVE      org.w3c.css.sac_1.3.1.v200903091627
696      ACTIVE      org.w3c.dom.events_3.0.0.draft20060413_v201105210656
697      ACTIVE      org.w3c.dom.smil_1.0.1.v200903091627
698      ACTIVE      org.w3c.dom.svg_1.1.0.v201011041433
osgi> uninstall 5
|=====ShoppingStore manager consumer stopped.=====
osgi>
```

## 10.Publisher Stop & Start

```
691      ACTIVE      org.slf4j.api_1.7.2.v20121108-1250
                        Fragments=9
692      RESOLVED    org.slf4j.impl.log4j12_1.7.2.v20131105-2200
                        Master=691
693      ACTIVE      org.tukaani.xz_1.8.0.v20180207-1613
694      ACTIVE      org.uddi4j_2.0.5.v200805270300
695      ACTIVE      org.w3c.css.sac_1.3.1.v200903091627
696      ACTIVE      org.w3c.dom.events_3.0.0.draft20060413_v201105210656
697      ACTIVE      org.w3c.dom.smil_1.0.1.v200903091627
698      ACTIVE      org.w3c.dom.svg_1.1.0.v201011041433
osgi> stop 6
Publisher Stop
osgi>
osgi> start 6
Publisher Start
osgi>
```

## 11.Publisher Uninstall

```
687      ACTIVE      org.sat4j.core_2.3.5.v201308161310
688      ACTIVE      org.sat4j.pb_2.3.5.v201404071733
689      ACTIVE      org.sat4j.pb_2.3.5.v201404071733
690      ACTIVE      org.slf4j.api_1.7.30.v20200204-2150
                        Fragments=9
691      ACTIVE      org.slf4j.api_1.7.2.v20121108-1250
                        Fragments=692
692      RESOLVED    org.slf4j.impl.log4j12_1.7.2.v20131105-2200
                        Master=691
693      ACTIVE      org.tukaani.xz_1.8.0.v20180207-1613
694      ACTIVE      org.uddi4j_2.0.5.v200805270300
695      ACTIVE      org.w3c.css.sac_1.3.1.v200903091627
696      ACTIVE      org.w3c.dom.events_3.0.0.draft20060413_v201105210656
697      ACTIVE      org.w3c.dom.smil_1.0.1.v200903091627
698      ACTIVE      org.w3c.dom.svg_1.1.0.v201011041433
osgi> uninstall 6
Publisher Stop
osgi>
```

## 12.Cashier Consumer Start

```
1014|Active      | 4|W3C SVG DOM (1.1.0.v201011041433)
1015|Resolved     | 4|CashierServiceConsumer (1.0.0.qualifier)
1016|Active      | 4|ServicePublisher (1.0.0.qualifier)
osgi> start 1015
=====Start Shopping Store Cashier Service Consumer=====
-----Welcome to Billing-----
Please Select an option to continue....
Options
1.View Items List
2.Generate Customer Bills and Display Receipt
3.Exit
Enter your selection...
1
-----Items List-----
Item ID:   Item Name:   Item Price:  Item Quantity:  Discount Percentage:
1          Item1       200.0       2               20.0
2          Item2       500.0       5               10.0
Press 0 to navigate back to home or press any other key to continue...
```

## 13.Cashier Consumer Stop

```
Press 0 to navigate back to home or press any other key to continue...
0
-----Welcome to Billing-----
Please Select an option to continue....
Options
1.View Items List
2.Generate Customer Bills and Display Receipt
3.Exit
Enter your selection...
3
osgi> stop 1015
=====Shopping Store Cashier Service Consumer Stopped.=====
osgi>
```

## 14. Cashier Consumer Uninstall

```
692      RESOLVED      org.slf4j.impl.log4j12_1.7.2.v20131105-2200
Master=691
693      ACTIVE        org.tukaani.xz_1.8.0.v20180207-1613
694      ACTIVE        org.uddi4j_2.0.5.v200805270300
695      ACTIVE        org.w3c.css.sac_1.3.1.v200903091627
696      ACTIVE        org.w3c.dom.events_3.0.0.draft20060413_v201105210656
697      ACTIVE        org.w3c.dom.smil_1.0.1.v200903091627
698      ACTIVE        org.w3c.dom.svg_1.1.0.v201011041433
osgi> stop 6
Publisher Stop
osgi>
osgi> start 6
Publisher Start
osgi> uninstall 2
Press 4 to Delivery Service
=====Online Shopping Cashier Service Consumer Stopped.=====
osgi>
```

## 15.All Bundles

```
Console
consumer [OSGi Framework] C:\Program Files\Java\jre1.8.0_231\bin\javaw.exe (Apr 19, 2021, 9:43:00 PM)

osgi> ss
|"Framework is launched."

id      State      Bundle
0       ACTIVE    org.eclipse.osgi_3.15.100.v20191114-1701
        Fragments=468
1       ACTIVE    org.eclipse.equinox.simpleconfigurator_1.3.400.v20191015-1836
2       ACTIVE    CashierServiceConsumer_1.0.0.qualifier
3       ACTIVE    CustomerServiceConsumer_1.0.0.qualifier
4       ACTIVE    DeliveryServiceConsumer_1.0.0.qualifier
5       ACTIVE    ManageServiceConsumer_1.0.0.qualifier
6       ACTIVE    ServicePublisher_1.0.0.qualifier
7       ACTIVE    ch.qos.logback.classic_1.1.2.v20171220-1825
        Fragments=356
8       ACTIVE    ch.qos.logback.core_1.1.2.v20160208-0839
9       RESOLVED  ch.qos.logback.slf4j_1.1.2.v20160301-0943
        Master=690
10      ACTIVE    com.google.gson_2.8.2.v20180104-1110
11      ACTIVE    com.google.guava_27.1.0.v20190517-1946
12      ACTIVE    com.google.guava_21.0.0.v20170206-1425
13      ACTIVE    com.google.javascript_0.0.20160315.v20161124-1903
14      ACTIVE    com.google.protobuf_2.4.0.v201105131100
15      ACTIVE    com.ibm.icu_64.2.0.v20190507-1337
16      ACTIVE    com.jcraft.jsch_0.1.55.v20190404-1902
17      ACTIVE    com.jcraft.jzlib_1.1.1.v201205102305
18      ACTIVE    com.sun.el_2.2.0.v201303151357
19      ACTIVE    com.sun.jna_4.5.1.v20190425-1842
20      ACTIVE    com.sun.jna.platform_4.5.1.v20190425-1842
21      ACTIVE    com.sun.xml.bind_2.2.0.v201505121915
22      ACTIVE    javaewah_1.1.6.v20160919-1400
23      ACTIVE    javax.activation_1.1.0.v201211130549
24      ACTIVE    javax.activation_1.1.0.v20160301-0943
```

## D)Sample Screenshots of its Behavior & Outputs

### 1. Customer Selecting Items



```
Console [ShoppingStoreCustomerSubscriber [OSGi Framework] C:\Program Files\Java\jre1.8.0_281\bin\javaw.exe (19 Apr 2021, 19:18:03)]

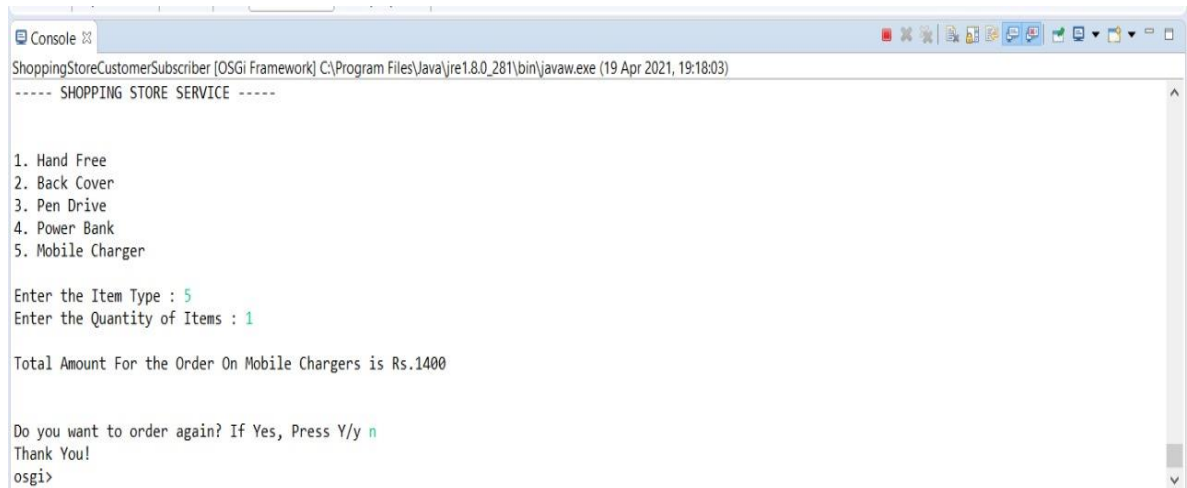
----- SHOPPING STORE SERVICE -----

1. Hand Free
2. Back Cover
3. Pen Drive
4. Power Bank
5. Mobile Charger

Enter the Item Type : 3
Enter the Quantity of Items : 4

Total Amount For the Order On Pen Drives is Rs.4800

Do you want to order again? If Yes, Press Y/y y|
```



```
Console [ShoppingStoreCustomerSubscriber [OSGi Framework] C:\Program Files\Java\jre1.8.0_281\bin\javaw.exe (19 Apr 2021, 19:18:03)]

----- SHOPPING STORE SERVICE -----

1. Hand Free
2. Back Cover
3. Pen Drive
4. Power Bank
5. Mobile Charger

Enter the Item Type : 5
Enter the Quantity of Items : 1

Total Amount For the Order On Mobile Chargers is Rs.1400

Do you want to order again? If Yes, Press Y/y n
Thank You!
osgi>
```



## 2.Manager Add Items to Store

```
Console
consumer [OSGi Framework] C:\Program Files\Java\jre1.8.0_231\bin\javaw.exe (Apr 19, 2021, 10:03:09 PM)
=====ShoppingStore manager consumer started.=====
Publisher Start
-----Welcome to Items Management-----
Please Select an option to continue.....
Options
1.Add a new item to the store
2.Update an item in the store
3.Delete an item from the store
4.List All Items
5.Search Item by Name
6.Exit
Enter your option...
1
Item Name
pen
Item Price
25
Discount
2
Successfully added the item!
Press 0 to navigate back to home or press any other key to continue....
```

## 3.Manager Update Items

```
Press 0 to navigate back to home or press any other key to continue....
0
-----Welcome to Items Management-----
Please Select an option to continue.....
Options
1.Add a new item to the store
2.Update an item in the store
3.Delete an item from the store
4.List All Items
5.Search Item by Name
6.Exit
Enter your option...
2
Item Name
pen
Item Price
30
Discount
5
Successfully updated the item!
Press 0 to navigate back to home or press any other key to continue....
<
```

## 4.Manager Delete Item

```
-----Welcome to Items Management-----
Please Select an option to continue.....
Options
1.Add a new item to the store
2.Update an item in the store
3.Delete an item from the store
4.List All Items
5.Search Item by Name
6.Exit
Enter your option...
3
Enter the item name:
pen
Successfully Removed the item!
Press 0 to navigate back to home or press any other key to continue....
```

## 5.Manager Search Items

```
-----Welcome to Items Management-----
Please Select an option to continue.....
Options
1.Add a new item to the store
2.Update an item in the store
3.Delete an item from the store
4.List All Items
5.Search Item by Name
6.Exit
Enter your option...
5
Enter the item name
pen
Item found!
Press 0 to navigate back to home or press any other key to continue....
```

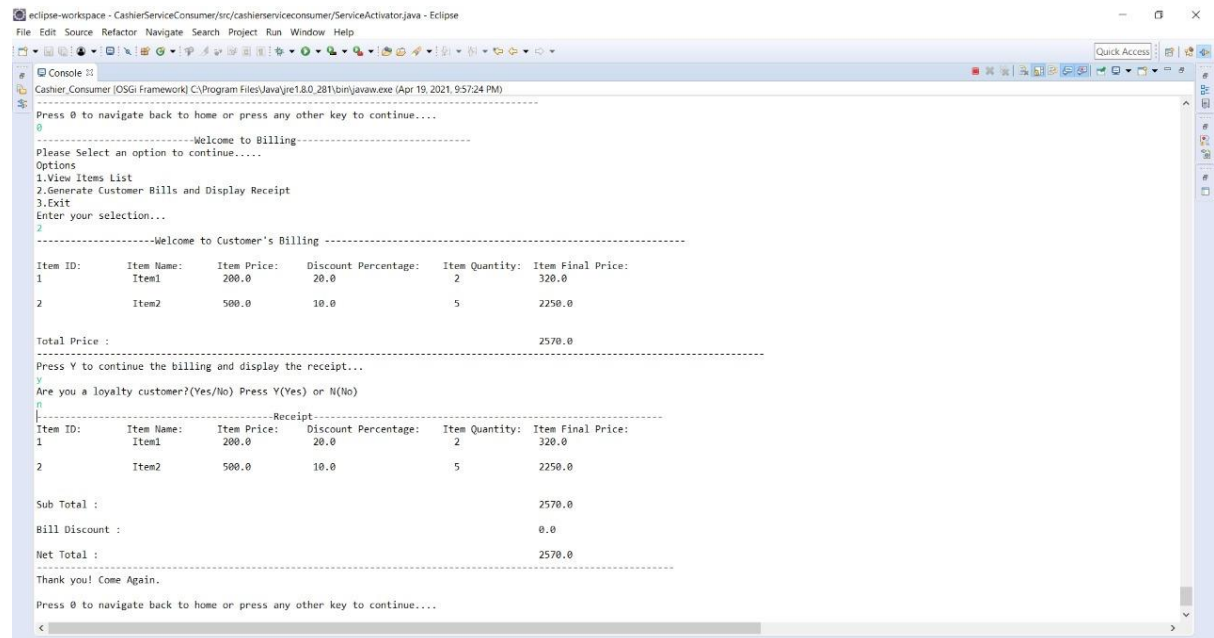
## 6.Manager View Added Items

```
-----Welcome to Items Management-----
Please Select an option to continue.....
Options
1.Add a new item to the store
2.Update an item in the store
3.Delete an item from the store
4.List All Items
5.Search Item by Name
6.Exit
Enter your option...
4
-----Item list-----
Item ID:      Item Name:      Item Price:      Discount Percentage:
2             pen             25.0             2.0
2             book            40.0             2.0
3             pen             35.0             3.0
-----
Press 0 to navigate back to home or press any other key to continue....
```

## 7. Cashier View the Bill

```
1014|Active | 4|W3C SVG DOM (1.1.0.v201011041433)
1015|Resolved | 4|CashierServiceConsumer (1.0.0.qualifier)
1016|Active | 4|ServicePublisher (1.0.0.qualifier)
osgi> start 1015
=====Start Shopping Store Cashier Service Consumer=====
-----Welcome to Billing-----
Please Select an option to continue....
Options
1.View Items List
2.Generate Customer Bills and Display Receipt
3.Exit
Enter your selection...
1
-----Items List-----
Item ID: Item Name: Item Price: Item Quantity: Discount Percentage:
1 Item1 200.0 2 20.0
2 Item2 500.0 5 10.0
-----
Press 0 to navigate back to home or press any other key to continue....
```

## 8.Cashier Generate The Bill



```
eclipse-workspace - CashierServiceConsumer/src/cashierserviceconsumer/ServiceActivator.java - Eclipse
File Edit Source Refactor Navigate Search Project Run Window Help
Cashier_Consumer (OSGi Framework) C:\Program Files\Java\jre1.8.0_281\bin\javaw.exe (Apr 19, 2021, 9:57:24 PM)
-----Welcome to Billing-----
Please Select an option to continue....
Options
1.View Items List
2.Generate Customer Bills and Display Receipt
3.Exit
Enter your selection...
2
-----Welcome to Customer's Billing -----
Item ID: Item Name: Item Price: Discount Percentage: Item Quantity: Item Final Price:
1 Item1 200.0 20.0 2 320.0
2 Item2 500.0 10.0 5 2250.0
Total Price : 2570.0
-----
Press Y to continue the billing and display the receipt...
y
Are you a loyalty customer?(Yes/No) Press Y(Yes) or N(No)
n
-----Receipt-----
Item ID: Item Name: Item Price: Discount Percentage: Item Quantity: Item Final Price:
1 Item1 200.0 20.0 2 320.0
2 Item2 500.0 10.0 5 2250.0
Sub Total : 2570.0
Bill Discount : 0.0
Net Total : 2570.0
-----
Thank you! Come Again.
Press 0 to navigate back to home or press any other key to continue....
```

## 9.Selecting Delivery Range

```
Console x
consumer [OSGi Framework] C:\Program Files\Java\jre1.8.0_231\bin\javaw.exe (Apr 19, 2021, 10:14:39 PM)
Publisher Start
=====Shopping Store Deliver Consumer Started!=====

Do you want to deliver the purchased item? If Yes, Press Y/y y

----- SHOPPING STORE DELIVERY SERVICE -----

Delivery is Free !!! for the deliveries within the Galle district
1. Deliveries within Galle District
2. Deliveries within 50 to 100 km range
3. Deliveries within 100 to 200 km range
4. Deliveries within 200 to 300 km range

Enter the Distance Type : 4
|
Total Amount For the Delivery is Rs 600

Please Select an option to continue.....
Options
1.Add delivery details
2.Update delivery details
3.View delivery details
4.Exit
Enter your option...
```

## 10. Add delivery details with validations

```
----- SHOPPING STORE DELIVERY SERVICE -----

Delivery is Free !!! for the deliveries within the Galle district
1. Deliveries within Galle District
2. Deliveries within 50 to 100 km range
3. Deliveries within 100 to 200 km range
4. Deliveries within 200 to 300 km range

Enter the Distance Type : 4

Total Amount For the Delivery is Rs 600

Please Select an option to continue.....
Options
1.Add delivery details
2.Update delivery details
3.View delivery details
4.Exit
Enter your option...
1
Delivery Address
14/B,ch lane,Colombo
Contact
0765678432
valid contact number
Successfully added delivery!
Press 0 to navigate back to home or press any other key to continue....
```

## 11. Update Delivery Details

```
14/B,ch lane,Colombo
Contact
0765678432
valid contact number
Successfully added delivery!
Press 0 to navigate back to home or press any other key to continue....
0
Please Select an option to continue.....
Options
1.Add delivery details
2.Update delivery details
3.View delivery details
4.Exit
Enter your option...
2
Delivery Address
14/B,ch lane,Colombo
Contact
0897654345
Successfully updated delivery details!
Press 0 to navigate back to home or press any other key to continue....
```

## 12. View Delivery Details

Successfully updated delivery details!

Press 0 to navigate back to home or press any other key to continue....

0

Please Select an option to continue.....

Options

1.Add delivery details

2.Update delivery details

3.View delivery details

4.Exit

Enter your option...

3

|-----Your Delivery Details-----|

Delivery ID:	Delivery Address:	Contact Number:
1	14/B, ch lane, Colombo	0897654345

-----  
Press 0 to navigate back to home or press any other key to continue....